

### Claims

1. A method for producing copolymeric polyacrylate pressure-sensitive adhesives, in which a monomer mixture comprising acrylic acid and/or methacrylic acid and/or derivatives thereof is subjected to a free-radical polymerization, characterized in that, based on the monomer mixture, 0.05% to 25% by weight of acrylated or methacrylated nitroxide derivatives of the general formula



is used, where  $\text{R}_1 = \text{H}$  or  $\text{CH}_3$  and  $\text{R}_3$  is a nitroxide derivative,

or in that a polyacrylate is reacted with a nitroxide derivative to give a nitroxide-modified polyacrylate corresponding to one obtained in accordance with the first alternative.

2. The method of claim 1, characterized by free-radical polymerization of at least the following constituents:

(A) acrylic acid and/or methacrylic acid and/or derivatives thereof according to the formula



where  $\text{R}_1 = \text{H}$  or  $\text{CH}_3$  and  $\text{R}_2 =$  an alkyl chain having 2-20 carbon atoms, in a fraction of 45% to 99.95% by weight,

(B) acrylated or methacrylated nitroxide derivatives of the general formula

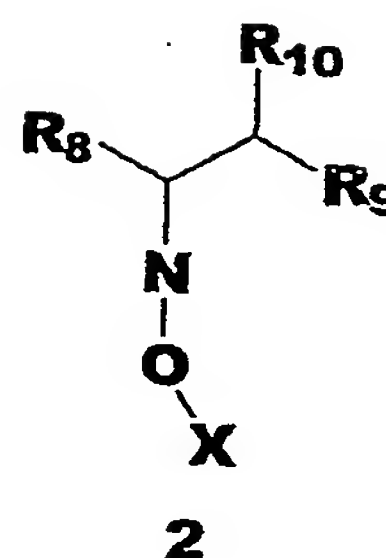
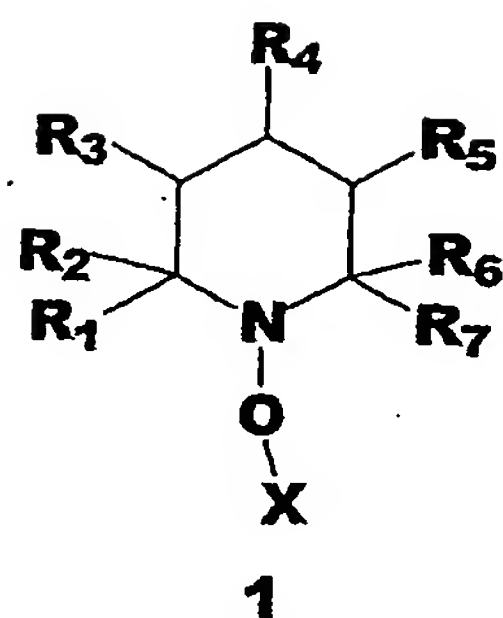


where  $\text{R}_1 = \text{H}$  or  $\text{CH}_3$  and  $\text{R}_3$  is a nitroxide derivative, in a fraction of 0.05% to 25% by weight.

3. The method of claim 1 or 2, characterized in that the polymerization is additionally carried out with

(C) at least one vinyl compound having functional groups, or a mixture thereof, in a fraction of 0% to 30% by weight, based on the monomer mixture.

4. The method of any one of claims 1 to 3, characterized in that as nitroxide derivative a compound is used which may be represented by one of the following general formulae



**$R_1$ - $R_9$  = alkyl or aryl or further functional groups**

5. The method of any one of claims 1 to 4, characterized in that the vinyl compound  
5 is selected from the group consisting of vinyl acetate, acrylamides, and photoinitiators functionalized with double bond.
6. The method of any one of claims 1 to 5, characterized in that the polymerization  
10 takes place in solution, preferably in organic solvents or water or a mixture of organic solvents and water, the solvent preferably comprising high-boiling aromatics, especially toluene or xylene.
7. The method of any one of claims 1 to 6, characterized in that in a further step at  
15 least one further monomer is added to the nitroxide-modified polyacrylate and, after an increase in temperature to at least 100°C, a nitroxide-controlled free-radical polymerization, initiated by the cleavage of the nitroxide derivative and formation of free radicals along the polyacrylate backbone, is carried out to give a comb block polymer.
8. The method of claim 7, characterized in that the nitroxide-modified polyacrylate  
20 prepared in solution is admixed with the further monomer and thereafter is subjected to a concentration step at elevated temperature, thereby initiating the free-radical polymerization with the further monomer to give the comb block polymer.
9. The method of claim 7, characterized in that, following concentration where  
25 appropriate, the nitroxide-modified polyacrylate is admixed with the further monomer and subsequently processed further in a hotmelt process, in which the free-radical polymerization with the further monomer is initiated to give the comb block polymer.

10. The method of any one of claims 7 to 9, characterized in that the further monomer is styrene, a styrene derivative, an acrylate or a methacrylate.

11. The method of claim 10, characterized in that the molecular weight of the individual polystyrene blocks is adjusted to between 500 and 50 000 g/mol, preferably between 4000 and 30 000 g/mol.

12. The method of any one of claims 7 to 11, characterized in that the temperature of the polyacrylate composition for copolymerization with the further monomer is increased to 130°C.

13. A nitroxide-modified polyacrylate obtainable by a method of any one of claims 1 to 12.

14. The nitroxide-modified polyacrylate of claim 13, characterized by an average molecular weight of between 500 000 and 2 000 000 g/mol ( $M_w$ ), preferably between 600 000 and 1 000 000 g/mol ( $M_w$ ).

15. A comb block polymer having pressure-sensitive adhesion properties, obtainable by polymerizational attachment of blocks onto a nitroxide-modified polyacrylate of claim 13 or 14 by a method of any one of claims 7 to 12.

16. The use of the comb block polymer of claim 15 for producing pressure-sensitive adhesive articles.

17. The use of claim 16 for producing pressure-sensitive adhesive tapes or sheets by coating one or both sides of a backing with a pressure-sensitive adhesive which comprises or consists of the comb block polymer of claim 15.

18. The use of claim 16 or 17, wherein the comb block polymer, before or during processing to give the pressure-sensitive adhesive articles, has been blended with crosslinkers, resins, plasticizers, fillers or other additives or auxiliaries.